Journal of
Controversies in Obstetrics & Gynecology and Pediatrics

Original Article

DOI: 10.51271/JCOGP-0021

A study on the factors affecting polycystic ovary syndrome in young women

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Cite this article: Küçükakça AŞ, Gürbüz T. A study on the factors affecting polycystic ovary syndrome in young women. *J Controv Obstetr Gynecol Ped.* 2023;1(4):95-98.

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Received: 19/09/2023 ◆ **Accepted**: 12/10/2023 ◆ **Published**: 20/10/2023

ABSTRACT

Aims: The aim of this study was to define the incidence of polycystic ovary syndrome (PCOS) in young women and the affecting characteristics. In this study, environmental factors and demographic characteristics of women with PCOS were compared with the control group, which included healthy young women.

Methods: This is a retrospective study with control in young women aged 18-25, suffering from PCOS and healthy women, referred to our clinic between September 2018- August 2020. Women's socio-demographic characteristics such as age, weight, height, economic status, employment status, education status, smoking and alcohol abuse, chronic disease, exercise status, family history of cancer, and menstrual irregularity of participants were compared.

Results: Results did not show a statistically significant association between case and control regarding age, economic status, education status, family history of cancer, smoking and alcohol abuse ($p>0.05$). There was a statistically significant difference between groups regarding menstrual irregularity, chronic disease, body mass index (BMI), exercise and working status ($p<0.05$). Healthy women exercise more, and a higher percentage of them are employed. Chronic diseases were more common in women with PCOS. Women with PCOS were fatter and had more menstrual irregularities problems.

Conclusion: BMI, working status, exercise status, menstrual irregularity, and chronic disease status helped diagnose PCOS in young women.

Keywords: Polycystic ovary syndrome, PCOS, young women, BMI, menstrual irregularity.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common syndrome and one of the causes of infertility in women of reproductive age, which has profound effects on the lives of young women.[1,2] Its most important clinical symptoms are menstrual disorders, skin diseases caused by the increase of endogenous hormones such as acne, hirsutism, and hair loss, brown areas on the neck and arms due to insulin resistance, and problems related to pregnancy such as irregular ovulation, infertility, and repeated abortion.[3,4] The effects of this syndrome on the pregnancy process in young women have revealed the importance of research on this disease.

In the examination of serum tests of women with PCOS, it has been found that they have lower levels of follicle stimulating hormone (FSH), Sex hormone-binding globulin (SHGB), and High-density lipoprotein (HDL) hormones. Also, Luteinizing Hormone (LH), testosterone, insulin, cholesterol, and triglyceride hormone levels are higher in these women than in healthy women.[5,6] These factors cause obesity, insulin resistance, and high blood pressure, which in the long run increases the risk of type 2 diabetes and cardiovascular diseases.[7] PCOS, which affects women in many ways, also causes a decline in quality of life.[8,9] PCOS is a significant health issue affecting all periods of women's lives, especially young adulthood.[10]

Over the past two decades, many studies have been conducted to find the causes of PCOS. Genetic factors are influential factors in this syndrome, and the etiology of this syndrome proves that it is hereditary.[11] More than 70 effective candidate genes in this syndrome have been evaluated in previous studies; however, due to genetic and phenotypic heterogeneity, the results of these studies remained inconclusive.[12] Limited studies have been conducted on environmental and demographic factors' role in this syndrome.

This study compared the demographic characteristics and lifestyle of young women with PCOS with healthy women. This study aimed to identify the different parameters in

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women with this syndrome. As the newest and most advanced treatment method, person-centered medicine emphasizes individual characteristics. In this method, treatment and lifestyle suitable for each person are provided based on the characteristics of each person. The main goal of this study is to identify environmental factors that are effective in this disease and provide effective treatment methods based on person-centered medicine. This study was conducted to determine the factors affecting PCOS in young women.

METHODS

The study was carried out with the permission of Beykoz University Ethics Committee (Date:12.01.2021, Decision no:1). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki and documented declared permission was received from all women.

This is a retrospective study with women aged 18-25, referred to the Beykoz University Hospital between September 2018-August 2020. This study divided women with PCOS into two groups: Women with PCOS as a case group (n=100) and healthy women (n=150). This study gathered data with the patient inquiry form. In the patient inquiry form, women's socio-demographic characteristics such as age, weight, height, economic status, employment status, education status, smoking and alcohol abuse, chronic disease, exercise status, family history of cancer, and menstrual irregularity were questioned.

Women participating in this study were classified into three groups based on the body mass index (BMI) value. Underweight fora BMI less than 18.5 kg/m², normal weight fora BMI greater than or equal to 18.5 to 24.9 kg/m² and overweight fora BMI greater than or equal to 25. The economic status of the family was determined based on the family income. It was classified as a low-income family if it was less than 300 dollars. If it was between 300-800 dollars, it was classified as a middle-class family, and more than that was classified as a wealthy family. It was considered a regular exercise activity if a person exercises more than three times during the week and each time for more than 1.5 hours. For alcohol abuse, study participants were classified as women who consumed more than seven drinks per month. Study participants were classified as smokers if they smoked more than five weekly cigarettes.

Statistical Analysis

The Pearson chi-square test was used to compare qualitative data. After the normality test of age and BMI data by using the Shapiro-wilk test, Independent Samples t-test was used to compare between two groups. Mean (M) and standard deviation (SD) were used for descriptive characteristics for numerical values. SPSS v22was used for statistical analyses. A value of $p<0.05$ was accepted as statistically significant.

To calculate the sample size with the G-Power 3.2 program, difference between two independent proportions was measured based on the Pearson's Chi-Square Test of Association with the power of 80%, effect size of 50%, and 0.25 type 1 error for at least 228 patients.[13]

RESULTS

A total of 250 young women participated in this study. Table 1 shows the comparison of women with suffering from PCOS and healthy group in study parameters.

Table 1. The significant relationship between women with suffering from PCOS and healthy groups

Study parameters		Total (n=250) n (%)	Case (n=100) n (%)	Healthy women (n=150) n (%)	*p*-value
Age		22.29±1.91	21.95±0.96	22.63±3.14	0.129*
BMI		24.86±0.98	26.18±1.05	23.98±1.07	**0.02***
Working status	Employed	85 (34)	25 (25)	60 (40)	**0.04****
	Unemployed	165 (66)	75 (75)	90 (60)	
Economic status	Wealthy	61 (24.4)	23 (23)	37 (25.3)	0.194**
	Middle	160 (64)	66 (66)	94 (62.6)	
	Low-income	29 (11.6)	11 (11)	18 (12)	
Education status	High school	145 (58)	60 (60)	85 (56.6)	0.812**
	University	105 (42)	40 (40)	65 (43.4)	
Smoker	Yes	30 (12)	13 (13)	17 (11.3)	0.108**
	No	220 (88)	87 (87)	133 (88.7)	
Alcohol abuse	Yes	70 (28)	25 (25)	45 (30)	0.091**
	No	180 (72)	75 (75)	105 (70)	
Chronic disease	Yes	28 (11.2)	20 (20)	8 (5.3)	**<0.001****
	No	222 (88.8)	80 (80)	142 (94.7)	
BMI groups	Underweight	50 (20)	19 (19)	31 (20.6)	**<0.001****
	Normal	136 (54.4)	31 (31)	105 (70)	
	Overweight	64 (25.6)	50 (50)	14 (9.4)	
Exercise status	Yes	44 (17.6)	11 (11)	33 (22)	**0.038****
	No	206 (82.4)	89 (89)	117 (78)	
Family history of cancer	Yes	15 (6)	5 (5)	10 (6.7)	0.109**
	No	235 (94)	95 (95)	140 (93.3)	
Menstrual irregularity	Yes	90 (36)	51 (51)	39 (26)	**0.014****
	No	160 (64)	49 (49)	111 (74)	

*A Independent Samples t-test, **A Chi-square test, BMI: body mass index.

Table 1 shows the comparison of women with suffering from PCOS and healthy group on the study parameters. As stated in Table 1, an independent Samples t-test did not find a statistically significant association between case and control regarding age ($p>0.05$). There was a significant association between two groups in terms of BMI ($p<0.05$). It indicated that BMI of case group (M=26.18, SD=1.05) were higher than BMI of healthy women (M=23.98, SD=1.07). There [was or was not] a significant relationship between the two variables.

The relationship between the working status and suffering from PCOS was assessed using a Pearson's Chi-Square Test of Association. There was a significant relationship between the two variables ($p<0.05$). As can be seen from the table 1, there was not a statistically significant association between healthy women and women with PCOS regarding economic status, education status, family history of cancer, smoking and alcohol abuse ($p>0.05$).

There was a significant relationship between the chronic disease status and suffering from PCOS ($p< 0.05$). There was a significant relationship between BMI groups and suffering from PCOS ($p<0.05$). There was a significant relationship between the exercise status and suffering from PCOS ($p< 0.05$). The Pearson's Chi-Square Test of Association found a significant relationship between the menstrual irregularity and suffering from PCOS ($p< 0.05$).

Figure shows the parameters that significantly differ between the two groups. The numbers specified in this figure are in percentage form.

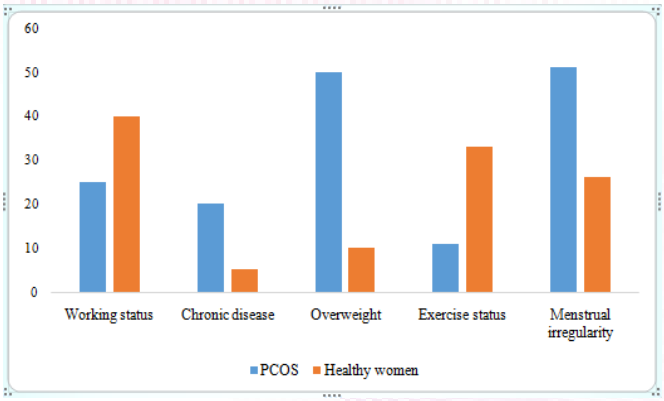

Figure. The parameters have a significant difference between the two groups

DISCUSSION

Based on the study's findings, a significant difference was reported between the two groups of cases and healthy women in terms of BMI, working status, chronic disease, exercise status, and menstrual irregularity parameters. In this study, the percentage of employed women in the case group was lower than healthy women (25% vs. 40%). Women suffering from chronic disease had a higher percentage in the case group (20% vs. 8%). The percentage of athlete women in the case group was three times lower than healthy women (11% vs. 33%). The prevalence of menstrual irregularity in women with PCOS is twice as high as in healthy women (51% vs. 26%). In this study, consistent with previous studies, obesity is more common in women with PCOS (50% vs. 9.4%).

Obesity, overweight, and visceral fat accumulation are common in women with PCOS. More than 50% of these women are obese. In the present study, obesity and overweight in case group women were significantly more than healthy women. These results are consistent with previous studies.[14,15] Whether PCOS is the cause of obesity or obesity causes this disease is one of the challenging issues, and no exact answer has been provided by the researchers yet.[16]

This study showed statistically significant difference between two groups in terms of chronic disease. The prevalence of chronic diseases in healthy women is lower than in women with suffering from PCOS. Based on research, PCOS is extremely correlated with numerous chronic diseases, such as glucose intolerance, high blood pressure, hypercholesterolemia, diabetes mellitus type 2, and hepatic steatosis.[17] Increased insulin resistance in women with PCOS causes increased blood lipid levels. This position raises women's risk of cardiovascular disease as a chronic disease.[18]

Wang et al.[19] in a prospective study with 1127 women aged 19-32, showed no association between smoking and PCOS. They also did not report a significant relationship between alcohol abuse and PCOS. Previous studies showed that smoking can also cause irregularities in the menstrual cycle due to the imbalance in estrogen and FSH levels.[20,21] However, there was no significant difference between the two groups of smoking prevalence in this study because the participants were 18-25 years old, and they were not exposed to the impact of long-term smoking and alcohol abuse. Due to the damaging effects of alcohol and smoking in the long term, women with PCOS are advised to lead a healthy lifestyle and avoid smoking and alcohol.

Regular exercise's effect on lowering PCOS disease symptoms is evident. Harrison et al.[22] reported that regular sports intervention (either in resistance or aerobic sports) improves menstrual cycles and increases the possibility of reproduction. Butt et al.[23] in a systematic review, showed that physical activity reduces infertility, as well as psychological and social stress among women. However, it is impossible to comment on regular exercise's role in contracting this disease. In this study, a higher percentage of healthy women exercised regularly than patients.

The prevalence of menstrual irregularity in women with PCOS was predictable. Changing lifestyle through changes in diet and regular exercise programs is one of the low-cost and effective methods to improve the symptoms of patients with PCOS. Many researchers have emphasized it for decades.[23-25]

CONCLUSION

Finding the cause of the disease and the factors that aggravate the symptoms of PCOS is a way to provide treatments and solutions for this disease in person-centered medicine. This study found that the index of exercise and employment status, BMI, and chronic disease status of women affect the diagnosis of PCOS. Therefore, it is very important to determine the nutritional habits of women and increase physical and balanced activities to have a normal BMI. It is recommended that these patients become more aware of the cause of the disease, diagnostic criteria, symptoms, effective

factors, and long-term and short-term health problems of PCOS in order to manage this disease with low-cost solutions such as diet and exercise.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Beykoz University Ethics Committee (Date:12.01.2021, Decision No:1).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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